

BUS RAPID TRANSIT, it pays!

1.1

Innovation via high-frequency, high-quality bus transport

The major benefits of the BRT system

- Completion in one-and-a-half years
- Much more economical and flexible than the underground
- Standard buses also operate during off-peak periods
- Infrastructure works are 20 times less expensive
- Low operating costs
- No government subsidies

A high-level, eco-friendly, superior-quality mode of public transport that provides a solution to mobility problems while offering low infrastructure and operating costs. The innovative Bus Rapid Transit concept has been widely gaining ground and not only in big cities. Articulated buses with one or two “trailers” and dedicated lanes now offer a complete alternative to expensive tram, underground and light rail projects.

Traffic jams, demand for environmentally friendly and sustainable solutions to mobility problems, and the need to undertake well-thought-out initiatives for budgetary reasons are driving the development of innovative ideas in the field of transport. The response: the “Bus Rapid Transit” or BRT. Volvo Buses is the pioneer in this field, having launched the first project in the Brazilian city of Curitiba over 30 years ago (1975). High-floor, bi-articulated buses can measure up to 27 metres long and run at a high schedule speed on major arteries, stop at specific bus stops and, in a sense, form a fully fledged transport system. This

public transport concept was far ahead of its time because it generated a high capacity for high-level transport with low investment costs.

Even though the project was originally designed for the South American market and continued to expand there, BRT projects have increasingly cropped up elsewhere with low-floor buses. Other than specific projects underway in the United States, Canada, Australia and China, a number of BRT projects are currently under construction in France, Germany, Finland, the Netherlands and Turkey.

It is not only metropolitan areas like Istanbul, Bangkok and Mexico, but also European cities and business centres, that need fast and efficient public transport to meet auto-mobility needs. Gothenburg, Sweden, Volvo's stronghold, has built a third and fourth corridor for bi-articulated Volvo 7500s (25 m, 165 passengers) following the success of the existing operation. In 2006, the city of Nantes, France, opened a BusWay now plied by natural gas-fuelled, Mercedes-Benz Citaro G buses (18 m, 150 passengers).

Faster completion time

BRT can transport passengers at the same speed per hour as an express tram or light rail system. The only differences are that a BRT project can be completed much faster, that it's a much less expensive project and that it can put into operation with much greater flexibility. In addition, a BRT system allows standard buses to run during off-peak hours.

It is even possible to integrate existing tram lines into a BRT route. In Gothenburg, for example, trams and buses share the same dedicated lane.

Volvo Buses says that it's possible to complete a BRT project in one and a half years. Infrastructure costs represent barely 1/20th of the construction cost for a metro [underground] line and 1/5th the construction cost for an express tram or light rail system. What's more, marginal costs are lower because roads do not require any work.

Moreover, operating costs are also considerably lower and BRT systems can operate without government aid and in cooperation with private bus companies that want to invest in specially designed vehicles.

BRT is a modular and flexible concept that can be custom-designed for each city. Municipalities need only set up several major routes for subsequent feeder lines (for standard buses) as well “park-and-ride” systems for commuters. A BRT system is no different from large-scale tram operations, which are currently being tested in response to growing mobility problems.

BRT also offers the advantage of being more flexible than tram and light rail lines.

Lanes and routes can be adapted and extended relatively easily to, for example, residential areas and SME districts. Furthermore, articulated and bi-articulated buses are much more flexible than a vehicle on rails. An accident that occurs along a tram or light rail route can block the entire network, while buses can go around the accident site and choose another route. Just like any other bus, BRT vehicles are perfectly capable of leaving their own lane to rejoin traffic.

Bus lanes

Having its own lane is the key factor in ensuring the smooth operation of a concept such as BRT.

Bus Tram 1001_1

Building a tram line cost five times more than building a BRT line and takes far longer.

CapaCityI3

A Mercedes-Benz CapaCity vehicle is able to easily manoeuvre through daily traffic when leaving its lane.

VolvoColombia

Bus Rapid Transit systems are operating in many metropolitan areas in South American, including cities in Colombia.

VolvoSantiagoChile

In a BRT system, a stopped bus does not obstruct other vehicles, unlike trams and light rail vehicles. All other vehicles can thus continue on their way. (photo: Volvo Buses).

BRT: 10 key points

1. High-capacity bus
Large access doors that facilitate boarding and disembarking
2. High-frequency schedule
3. Exclusive bus lanes
4. No tickets sales on the bus
5. Stops adapted to either low-floor or high-floor vehicles (depending on the type of vehicle) to facilitate boarding and disembarking and simplify access for wheelchairs and pushchairs
6. Priority at intersections
7. Traffic regulation and management, with real-time tracking of buses
8. Very strong brand image and schedule information at bus stops that is not only completely up-to-date but that also allows passengers to plan their trips in advance
9. Sustainable and eco-friendly operation, mainly by private companies

European Bus System of the Future

The European Union firmly believes in the future of BRT concepts. The European Bus System of the Future (EBSF), launched by the European Commission, is one of the largest mobility-related research projects in the world.

EBSF aims to generate initiatives that are necessary for enhancing the appeal and image of urban bus systems. New modes of transport, such as the BRT concept, as well as new infrastructure and technology opportunities are interconnected and combined with the best operational practices.

Some 50 partners are working on this project, including five major European bus manufacturers: EvoBus, Irisbus, MAN, Scania and Volvo. In addition, six projects are being monitored in Bremerhaven, Budapest, Gothenburg, Madrid, Rome and Rouen.

www.ebsf.eu

Environmentally friendly

The BRT concept is based on buses, but it is not really comparable to traditional public bus systems. Instead, it is a specific transport concept using articulated or bi-articulated buses with a capacity of up to 270 passengers. As a result, the BRT concept doesn't only reduce the number of conventional buses in the urban landscape, but also carries more passengers in a far shorter span of time.

A BRT vehicle replaces some 100 cars while BRT infrastructure only takes up 5% of the road surface. BRT also protects the environment due to the reduced need for conventional buses. Highly noxious NO_x emissions are much lower per passenger-kilometre, even accounting for relatively low occupancy rates.

At this time, the buses are still largely fuelled by conventional, yet contemporary and eco-friendly, diesel engines. Major efforts are underway to introduce alternative fuels and hybrid power systems. Natural gas-fuelled Mercedes-Benz Citaro L buses circulate on the BusWay in Nantes.

Volvo 7500 biarticul2

In Gothenburg, eco-friendly, natural gas-fuelled buses are now operating in the BRT system.

(tableau)

Amount of time necessary for 60 passengers to climb on-board.

Type de vehicle

Length of time

Standard, high-floor vehicle

Standard, low-floor vehicle

Articulated, high-floor vehicle

Articulated, low-floor vehicle

Low-floor BRT vehicle

Source: Bernt Nielsen, Västtrafik Gothenburg

1.2

European BRT projects

Nantes changed its plans to build a tram line in order to install the BusWay.

290,000 residents

560,000 residents in the *arrondissement*

In 2000, the city of Nantes launched a mobility plan whose ultimate goal was the equal use of public transport and private cars. Sixty percent of the 225,000 people

working in Nantes (population of 580,000) were still commuting to work in their cars.

At that time, the Nantes region's public transport system comprised three tram lines (42 km overall), 60 bus lines and six express bus lines. In 2001, the city had planned to expand the network. According to estimates, it would have cost €135 million to install just 4 km of tram rails to serve some 17,000 residents in surrounding areas. This exorbitant price tag led the authorities to embark on a search for a lower-cost, yet equally effective alternative.

Thus was born the "Line 4" project, which combines the benefits of trams and buses. Fully equipped, dedicated facilities have been built for the BusWay, which connects the centre of Nantes to Porte de Vertou. The two central lanes of a four-lane, high-traffic road were converted into bus lanes.

It takes seven minutes for a bus to travel the 7 km-long BusWay. Factoring in the time required for loading and unloading passengers at 15 stops, the resulting schedule speed is 21 kph. During rush hour, 20 articulated Mercedes-Benz Citargo G vehicles (18 m, 150 passengers) run every three minutes on "Line 4" of the BusWay.

In the suburbs, the BusWay leaves its dedicated lane for several metres to merge with regular traffic. Specific road signs, however, yield the right-of-way to the BusWay when it leaves its own lane, which also holds true when it approaches intersections. Along segments of the route where a two-way bus lane would not have been feasible, buses alternate driving one-way in each direction and pass each other at stops.

The BusWay has required an investment of €7.5 million per kilometre compared to €22 million per kilometre for a tram line. The 15 stops were designed exactly like tram stops and protect passengers from bad weather. The platforms were designed to be optimally accessible for wheelchairs and children's pushchairs. At the level of the bus's second and third doors, a ramp slides out to cover the gap of several centimetres between the bus and platform. At eight stops, riders can connect to other bus and tram lines, which, in a sense, serve as transfer lines.

A real success

Ever since it was launched, the BusWay has turned out to be a great success. The number of passengers reached 25,000 a day in its first year, a figure that had been the three-to-four-year objective. During that time, 37% of motorists switched to the BusWay. One year after the BusWay was introduced, the number of cars travelling along the Line 4 route fell from 25,000 a day to 18,000 in 2006, just one year after the BusWay was launched. Research conducted among BusWay users demonstrates equal acceptance and appreciation of BRT and trams. www.tan.fr

CitaroNantes

The Nantes Busway replaced a costly tram project.

CitaroNantes2

For the Nantes BusWay, a design similar to that of a light rail or modern tram was chosen and that's also the impression it conveys to riders.

A metrobus every 30 seconds in Istanbul

10.3 million residents

12 million residents in the metropolitan area

In September 2006, Istanbul inaugurated its 18.3 m-long Metrobus system. And its BRT project has been growing ever since, with 250 Mercedes-Benz CapaCity buses now circulating on a 40.6 m network at a schedule speed of 40 kph. During morning and evening rush hour, a Metrobus even arrives every 30 seconds.

The Istanbul Metrobus opened to the public in 2006, with a 18.3 km route and 14 stops between the suburb of Avcilar to the north-east and Topkapi in the city centre. Using Mercedes-Benz CapaCity buses (19.5 m, 193 passengers), this high-frequency line transports up to a quarter of a million riders every day. According to statistics, this number can reach peaks of 17,300 riders per hour in both directions. Along the route it covers in its own lane, the bus can reach schedule-speed peaks of up to 40 kph.

The city of Istanbul has gradually expanded the bus network, which now covers more than 40 km. Completion of one-third of the route, or 11.2 km over the Bosphorus bridge, and installation of infrastructure adapted to bus stops only took 150 days. Overall, 250 Metrobuses carry more than one million passengers a day. From the outset, riders only had to wait 70 seconds for the next Metrobus on certain routes during rush hour, but now they need wait only 30 seconds.

Thus, for riders, the length of their daily commute on public transport has been reduced to a maximum of 40 minutes compared to an hour and a half in the past. To ensure high frequency, reduced travel time and passenger safety, the authorities decided on completely segregated bus lanes that never merge with regular traffic. Special signs have been installed along the way to tell drivers how fast they can drive. There are also directions indicating when to brake slowly and carefully to ensure maximum rider comfort.

www.iETT.gov.tr/en

CapaCityIstanbul

It only took 150 days to set up a 11.2 km BRT route.

CapaCityIstanbul

At rush hour, a bus arrives every 30 seconds in Istanbul's Metrobus system.

Gothenburg: from a single BRT line to 10

500,000 residents

850,000 residents in the *arrondissement*

The BRT 16 line connects the heart of Gothenburg with the old Norra älvstranden naval shipyards, a large-scale redevelopment project with many companies and schools. It was not even possible to meet demand with articulated-bus service at five-minute intervals. For that reason, the Gothenburg Sparvagar transport company quickly decided to deploy bi-articulated Volvo 7500 vehicles (24 m, 164 passengers).

These buses were introduced in 2006 in response to capacity problems at peak hours. As ridership continued to grow, however, seven additional bi-articulated buses were ordered. Three years later, the buses switched roles: the 11 bi-articulated vehicles came to provide basic service, while the articulated buses provided supplementary service. Even though the bi-articulated Volvo 7500s operating in Gothenburg currently have a capacity of 165 riders, seating can be reconfigured to hold up to 200 passengers.

Meanwhile, Gothenburg has opened three more BRT lines, which are served by 30 articulated buses. The four BRT lines attract a daily ridership of 60,000, representing some 15% of all public transport users in Gothenburg. Volvo wants to introduce a bus prototype in autumn 2011. The prototype, which would be equipped with a central driver's cab, would also have an innovative interior concept to test its impact on dwell time at BRT stops. In addition, riders waiting at the various bus stations and stops would be informed about the arrival of the next bus.

Plans also call for introducing a system of advance ticket and mobile phone sales as well as on-board, credit card payment systems.

The "K2020 project" was developed to alleviate Gothenburg's public transport problems by 2020. The BRT lines play a crucial role: with service every five

minutes, which exceeds that of conventional buses, they link Gothenburg with tram and local bus lines. K2020 is being grafted onto three existing train lines as well as a dozen high-quality bus lines, which comprise the main structure, called “KomFort”.

The KomFort buses follow the main traffic arteries and unload passengers at a maximum distance of 400 m from the actual city centre.

Because KomFort bus lines are viewed as a completely separate means of transport, the K2020 plan makes no mention of costly projects such as light rail or express tram systems.

www.goteborg.se, www.k2020.se

Volvo7500biartic

The bi-articulated Volvo 7500 buses have turned the BRT concept into a real success for Gothenburg.

2.

BRT? Belgium opts for a traditional means of transport

Lack of knowledge characterises mobility plans

Brussels, Antwerp, Gand, Liege and probably Limburg as well are all perfect candidates for BRT projects. This concept does not appear in any government agreement or any mobility-related project. Yet Flemish, Walloon and Brussels government agreements of 2009 place great emphasis on mobility and public transport issues. These agreements discuss a variety of plans that particularly focus on tram and light rail projects. They make absolutely no mention, however, of BRT initiatives, even though this subject has often been addressed at conferences – including those organised by the International Association of Public Transport (UITP), with which STIB, Vlaamse Vervoersmaatschappij De Lijn and SRWT-TECs are affiliated.

The TECs [public transport companies in Wallonia, Belgium] also participate in a European Commission project called the “European Bus System for the Future”. As a result, Car & Bus magazine met with the relevant transport ministers, asking them to explain the absence of studies and initiatives, such as the BRT project, in the respective government agreements.

Brussels introduces “Buses with a High Level of Service”

In their government agreement, Brussels authorities mention their plan to continue expanding the Regional Express Network. Their goal is to use existing public transport in an appropriate manner, counting on the journey’s frequency and consistent speed. Plans also call for expanding the transport system to the north-west and north-east of the capital.

Additionally, the plan includes extending the metro and pre-metro [trams in the tunnels] lines to Schaarbeek, Uccle and Evere as well as building a tram line between the West Train Station and Westland Shopping Center and converting

the 71 bus line into a tram line. It also advocates creating exclusive bus lanes and coordinating red lights.

“Many aspects of BRT can also be found in the policy conducted by [Public Transport and Public Works] Minister Brigitte Grouwels (CD&V political party)”, says Philippe Vanstapel, her spokesperson. “That’s why she assigns great importance to reserving corridors for public transport. Minister Grouwels recently inaugurated bus and cycle lanes at Watermael Boitsfort. She is also focusing on another aspect of the BRT concept – coordinating red lights. In 2010, red lights will be adapted to give priority to buses and trams at no fewer than 100 new intersections. These investments are consistent with the VICOM programme, which is designed to increase the schedule speed of public transport. Despite the necessary belt-tightening, Minister Grouwels has allocated some €18 million for this programme. The minister is operating on the principle that people taking the bus will reach their destination as fast or even faster than those driving their own car”.

“BRT is a system that has been particularly successful in South American and English-speaking countries. It mainly involves transport over relatively long distances in places with relatively low populations, and has largely made use of segregated bus lanes on motorways”, says Vanstapel. “In Europe, we have leaned more towards BHLS (Buses with a High Level of Service) or BusWays, as in Nantes”.

Unlike BRT, these are urban concepts designed for relatively short distances in more densely populated regions. The buses operate in lanes specifically reserved for them. They also have priority at red lights and in most cases, their very specific characteristics distinguish them from conventional buses.

“In Brussels, we are also moving towards a BHLS-type public transport system given our existing public transport network and our existing roads. We support this concept 100% and are currently in the process of developing concrete plans,” says the minister’s spokesperson.

No reaction from Flanders or Wallonia

In its 2009-2014 policy statement, the Flemish government used the De Lijn “Mobiliteitsvisie 2020” as its guiding principle. This principle supports an integrated public transport system involving express buses, regional trunk and feeder lines, lines departing from suburban areas, urban buses, local buses and buses on request.

Priority is given to tram and light rail projects that fall in line with the following projects: Brabo I (Antwerpen), Spartacus plan (Hasselt-Maastricht), Neptunus plan (Veurne-Koksijde) and Regional Express Network (Brussels). The express buses, which partially follow the motorway, are proposed for the benefit of commuters. Moreover, the government agreement calls for lower operating costs and more efficient use of the operating budget. The viability of BRT projects was certainly not examined during development of “Mobiliteitsvisie 2020”.

The Walloon government agreement involves building tram lines to Liege, finishing the expansion of the Charleroi underground, putting more articulated buses into service, providing more Rapido express buses, building bus corridors and implementing measures to ensure the smooth flow of traffic.

Despite many requests, we have not received any response from Flemish Minister Hilde Crevits (CD&V) or Walloon Minister Philippe Henry (Ecolo) concerning the lack of BRT-type initiatives in government studies and agreements. Nor was there any response to our requests regarding the possibility of re-evaluating costly projects, such as building a light rail system or a tram line, in comparison with more economical concepts like BRT. Antwerp invested particularly heavily in extending its tram lines, whereas a BRT project would probably cost five times less and be at least as efficient.

Buses are well-known, while transport concepts are not

European politicians are too quick to associate BRT concepts with certain types of buses, rather than with transport concepts. Furthermore, decision-makers put more stock in prestigious tram and light rail projects than in the reliable and equally attractive metrobus project.

Are political officials sufficiently familiar with the BRT concept or must we explain it in detail and advocate on its behalf every time authorities opt for light rail or a tram line, even though BRT would be just as good an alternative and more economical as well?

“Officials are familiar with specific types of buses, but the BRT concept itself, involving a bus that operates in its own lane and has priority, is still not well known in large parts of the world”, says Gabriele Hellman, spokesperson for Daimler AG (EvoBus). “In Latin America, politicians are very familiar with the BRT system since it originated there. Elsewhere, officials only have a vague idea and the concept always has to be explained in detail. The size of the city, region and transport company and the company’s level of knowledge are decisive factors in generating interest in the system. Another problem is that officials do not attribute the same operating performance to the BRT concept as they do to a rail transport system. Such thinking can be refuted in a simple and tangible way. The BRT system is perfectly able to compete with light rail and trams and, what’s more, at significantly lower fares”.

Politicians promote rail transport

Hellman acknowledges that it’s not always easy to convince leaders and politicians about the advantages of BRT. “When a mayor has already adopted a positive attitude towards buses, it’s a little easier to introduce the subject of ‘BRTs’ than when you’re dealing with a ‘pro-tram’ mayor”. The most difficult thing is having to convince everyone that there’s a consensus about BRT in terms of its rider service benefits. And it’s not just politicians, but urban development specialists, project managers, financial experts and business people as well. In Europe, the problem is that rail transport is more highly valued and promoted than an urban bus system. So you have to advance the argument that BRT is just as reliable and attractive as a tram or light rail system”.

In South America and Asia, BRT are found in most of the major cities with wide boulevards. This raises the question of whether a BRT system is also feasible in historic European city centres, where access roads are often too narrow. “The introduction of new transport concepts, whether buses or trams, always

represents a challenge because each city is different”, says Hellman. “The artistry lies in being able to incorporate these plans into existing infrastructure, with historic sites, narrow streets and limited access to bridges and tunnels. In principle, BRT does not take up more space than trams, but in operational terms, it’s definitely more flexible. You also don’t have to worry about surface cables or installing them in or near historic buildings”.

The Daimler spokesperson also points out that along certain segments of the route, BRT could be combined with tram lines already operating in dedicated lanes. It would be perfectly feasible for BRT vehicles to partially travel on tram lines. Above all, priority should be placed on integrated transport concepts and it’s entirely possible to incorporate a BRT system into existing public transport structures. That can be done by harmonising schedules and frequency and by using the same infrastructure for stops. In principle, nothing prevents you from combining services. Of course, you would have to see if the budget allows it and if a joint service makes sense over the long term”.

Travelling on virtual rails

With the Phileas, VDL Bus & Coach created a flexible tram on wheels that travels on virtual rails. In terms of infrastructure and operations, a Phileas project is half the cost of a tram network. Following the pilot project in Eindhoven, Phileas buses are now running in Douai and Istanbul and more are planned, including projects in Amsterdam and Cologne. A variety of small Italian cities with narrow streets have expressed interest in the “trolley” version.

The Phileas project debuted in Eindhoven in the early 1990s. The city of Eindhoven had initially decided to build a tram line to a planned new development, but the budget could not support the necessary investment. As a result, the city went on the search for a high-capacity method of public transport that would be future-oriented, safe and environmentally friendly, in cooperation with local automotive companies and regional investment firms.

These considerations gave birth to the Phileas concept: a hybrid electric tram on tyres with the flexibility of a bus. Plans finally became reality in July 2004, when the first 12 vehicles – 11 18 m trams (140 riders) and one 24 m tram (171 riders) – began plying the route from the city centre to the regional airport and the suburb of Veldhoven. A few technical glitches delayed a flawless launch of this innovative project, but the Phileas has been operating for over a year to the great satisfaction of everyone concerned. At the same time, 12 Phileas vehicles are serving residents in the French town of Douai, and 50 26 m Phileas vehicles are providing high-frequency service in Istanbul’s MetroBus system (maximum capacity of 230-300, depending on the seating configuration and on the basis of eight people per sq.m).

In South Korea, a large-scale project was launched in collaboration with the Korean Railroad Research institute. With the Phileas as the transport mode and the support of local partners, a comprehensive concept was developed that includes adapted infrastructure, stations and other facilities.

Intelligent transport

“As a type of vehicle, the Phileas is much more similar to trams than to other BRT vehicles”, says Jos Janssens, marketing and project manager at Phileas Advanced Public Transport Systems (APTS). “The new generation of Phileas vehicles has more in common with a Guided Rapid Transit vehicle than with a Bus Rapid Transit. The vehicles are equipped with a guidance system that guides the Phileas on ‘virtual rails’. To that end, magnets were embedded in the roadway to serve as points of reference.

“A detection system connected to a central dispatching computer sits under the chassis. This system memorises the Phileas’s route. Any discrepancies recorded by the sensor in relation to the reference point are transmitted by the system to the central computer.

“We’re also talking about an intelligent vehicle. The on-board computer recognises the route, knows where the stops and curves are and where to apply

the brakes, and also knows the optimal speed to use between two stops. Slight discrepancies are automatically and comfortably corrected, a unique feature made possible by all of the axles' suspension and guidance. This also allows the Phileas to zigzag towards its stop so it can pull up to the platform no more than 5 cm from the edge".

Fine-tuning

In compliance with European regulations and French law, the guidance system is undergoing further improvement. At present, the eight Phileas trams are already operating in the form of a "bus".

Beginning in 2011, the guidance system will become operational and the vehicles will run as "trams" on virtual rails in compliance with safety standards that are even stricter than those currently in effect for trams.

"The Phileas represents much more than a tram", says Janssen. "The vehicle is designed to be modern and features the same capacities as a long, 30 m tram, but it's a lot more flexible. The Phileas can run automatically on virtual rails, but it's also possible for the driver to operate it. The bus is perfectly capable of deviating from its route to avoid an obstacle or modify or extend its route. What's more, buses leave and return to the depot without the need for any additional tracks, switches or surface cables; a simple garage and depot are all that's necessary".

Blends perfectly into the urban landscape

"The Phileas weighs a third less than trams due to the fact that its body panels are made of composite materials jointly developed with the aircraft manufacturer Fokker – which means that there is no need for additional foundations or for ballast to build a dedicated lane for the Phileas. The Phileas can thus be easily integrated into the urban landscape because it is not necessary to dig up roads or move underground pipes and cables. The only thing necessary for the guidance system is the installation of magnets in the roadway. Thanks to the axles' individual steering mechanism, the Phileas provides a steering lock that makes it

more reliable than a tram, allowing it to easily wend its way to a city's historic centre. And that explains why Italian cities like Pescara, Genoa and Rimini are so enthusiastic about the Phileas”.

“All of these extra benefits mean that the Phileas project costs 40% to 50% less than a tram, says Jansen, referring to both infrastructure and operating costs.

“That's the reason the concept is so successful with cities and transport companies that are interested in trams but do not have the necessary funds to build tracks. Trams, in fact, gave the Phileas its start. Nine out of 10 cities choose trams more for the positive image they evoke than for their key, functional role of transporting people quickly and comfortably from point A to point B. As a result, it has sometimes taken several years to persuade officials to go with the Phileas.

Officials have often already decided on a tram or light rail system based on mobility studies, but each time the project is called into question by a new mayor, coalition partner or majority. These parties challenge the project's economic feasibility and go off in search of alternatives. This provides the perfect opportunity to promote the Phileas, which offers a choice between the 18 m (140 passengers), 24 m (171 passengers) or 26 m (185 passengers) versions. As with the buses, various power systems are available, such as diesel-hybrid, fuel cell and trolley”, notes Jansen.

Phileas Fogg

The Phileas owes its name to Phileas Fogg, the man who, in a book by Jules Verne, wagered that he could travel around the world in 80 days after setting off from London.

In order to achieve this dream, every means of transport had to work in perfect harmony and reach an average speed of 23 kph. These goals are nearly identical to those set by VDL Bus & Coach's Advanced Public Transport System.

Jos Jansen: “This concept has been successful with cities and transport companies that are interested in trams but don’t have the necessary funds to build rails”.

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In Douai, the Phileas has proven that it is entirely feasible to integrate this type of vehicle into an historic city centre.

1257A or 1220

In Douai, the Phileas has been put on an even par with the tram, also evidenced by the roadway dividing line that warns remaining riders of the tram’s approach.

1279

In Douai, the Phileas travels in a dedicated lane with various stops right in the city centre. That’s why the vehicle has doors on both sides.

CW9P1048

Due to the axles’ individual steering system, the Phileas stops almost parallel with the edges of the platform.

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Because the Phileas pulls up very close to the station platform and leaves a gap of only a few centimetres, it is fully accessible to passengers in wheelchairs.

BRT: suited to regional transport as well

BRT is the transport concept of the future because it offers an efficient and high-performing solution to current mobility problems in and around our cities,

according to Peter Danielsson of Volvo Buses. In more rural areas, it is completely feasible to introduce an interurban BRT system that could even be five times larger than the objective set by the light rail budget.

“Bus Rapid Transit is the perfect solution for the contemporary mobility problems facing large and medium-sized cities”, says Danielsson, BRT manager at Volvo Buses. “For the same amount originally budgeted for a light rail or tram project, you can do so many more things. With the \$1 billion (€730 million) it takes to build 10 km of underground lines or 50 km of light rail lines, you could build a 250 km BRT system. The impact on the environment and mobility is therefore much greater than any results that could be achieved with public rail transport. During the introduction of the ‘congestion charge’ in Stockholm, a BRT network was set up alongside an existing shuttle system. Expanding railway lines and shuttle capacity takes much longer than setting up a BRT network, which is sometimes built parallel to railway tracks”.

More frequent service

“To meet mobility needs, the Gothenburg K2020 project calls for additional BRT lines of 120 km in a rather wide radius. The city’s politicians deliberately chose BRT due to the success of pre-existing lines and the budgetary impact. Far more kilometres can be built and far more residents served by public transport than would ever be possible with tram and light rail lines. Each shuttle seat requires an investment of €50,000, but only €5,000 in a BRT bus. As a result, we can offer much more frequent service and much higher capacity at a much lower cost”.

According to Danielsson, cities always think first about tram lines, mainly because they are not familiar with BRT. “Cities with hundreds of thousands of residents express a preference for tram lines in their mobility plans. First they cite environmental issues and then they say that trams are already part of the urban landscape or that the existing tram network is still limited. Such arguments are easy to refute. If you keep all of the tram system’s advantages, such as dedicated

facilities, high capacity, coordination of red lights, easy access to stops and advanced ticket sales, nothing prevents a successful introduction of a BRT system.

An autonomous BRT network can be set up, but it could also be part of a multi-modal public transport system in large cities. It would then be feasible to partially operate buses in segregated tram lanes, as we are doing in Gothenburg. Because both modes share infrastructure at stops, it is not always easy for trams and BRT to follow the same route. Only when BRT has its own facilities, as on Gothenburg's right bank, can we thoroughly execute and take full advantage of the BRT concept.

Speeds up to 90 kph

Even though BRT is generally associated with public transport in large cities, it can be effectively introduced in small cities located in rural areas. "In the Australian city of Brisbane, a BRT project was implemented in the wider region with a variety of population areas. A rail line would have required a huge investment. BRT buses now operate on concrete lanes or tracks at speeds of up to 90 kph. An interurban express bus system is entirely possible. Given the rise in commuting between large cities and surrounding areas, BRT is the most effective option in terms of cost, performance and flexibility", says the Volvo Buses BRT manager.